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EXAMINER	
KRYLOVA, IRINA	

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1796	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/532,686	MORINI ET AL.	
	Examiner	Art Unit	
	Irina Krylova	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed by applicant on 04/13/09 has been considered. Applicant's arguments, filed on 04/13/09 with respect to the rejection(s) of claim(s) 1-27 under 35 U.S.C. 102 and 35 U.S.C. 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made. Therefore, the rejection is made non-final.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1-16, 20-24** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 14, 20, 22-24 are independent claims reciting "selected from ethylene, propylene and mixtures thereof". This is neither a proper Markush recitation nor it is a proper alternative recitation. "One acceptable form of alternative expression, which is commonly referred to as a Markush group, recites members as being "selected from the group consisting of A, B and C." When materials recited in a claim are so related as to constitute a proper Markush group, they may be recited in the conventional manner, or

alternatively. For example, if "wherein R is a material selected from the group consisting of A, B, C and D" is a proper limitation, then "wherein R is A, B, C or D" shall also be considered proper. See MPEP 2173.05(h).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-7, 9-10, 14-17 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bullard et al** (US 3,849,520).

4. Bullard et al discloses a random copolymer of butene-1 with 0.1-10%wt of ethylene (as to instant claims 1, 5-7, 9, 10) comprising lengthy sequences of butene-1 units in isotactic configuration followed by random methylene sequences (col. 2, lines 22-24). The copolymer is produced in the presence of stereo-specific polymerization catalysts, by reacting butene-1 and ethylene in the presence of titanium trichloride and an organic aluminum compound (col. 2, lines 21-59).

5. As it is known in the art, a copolymer having reactivity ratio product of $r1.r2 < 2$ (0.6-1.5) is considered to be random . Since **Bullard et al** specifies the copolymer as being random, therefore, it would have been obvious to a one of ordinary skill in the art that the copolymer of **Bullard et al** would intrinsically have a reactivity ratio of less than 2.

6. Though **Bullard et al** does not specify a content of isotactic pentad or absence of 4,1-insertions, nevertheless, since **Bullard et al** discloses the same copolymer composition as claimed in the instant invention, specifies the copolymer having lengthy sequences of butene-1 units in isotactic configuration followed by random methylene sequences, produced by the same process, including the same catalyst system, as claimed in the instant invention, therefore, it would have been obvious to a one of ordinary skill in the art that the content of isotactic pentad in copolymer of **Bullard et al** would intrinsically fall within the same ranges as claimed in the instant invention and 4,1-insertions would be intrinsically be absent in copolymer of **Bullard et al.**

7. As to instant claims 14-17, **Bullard et al** discloses a composition comprising:
1) 50-95% wt of a polypropylene comprising a copolymer of propylene and minor amounts of ethylene (Abstract, col. 2, lines 10-17);
2) 5-50% wt of a random copolymer of butene-1 with 0.1-10%wt of ethylene (Abstract).

8. As to instant claim 23, **Bullard et al** discloses shrink packaging films produced from the random copolymer of butene-1 with 0.1-10%wt of ethylene (col. 1, lines 35-55).

9. Claims 1-16 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Tokui** (EP 1,215,239).

10. Tokui discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in Abstract), wherein the copolymer comprises an isotactic pentad index of 98% ([0042]) and polydispersity of not more than 6 (as to instant claim 4, cited in [0041]).

11. As to instant claims 24-25, the process for producing a polybutene-1 copolymer comprises polymerizing butenwe-1 and alpha olefin in the presence of a catalyst comprising titanium chloride, magnesium chloride, phthalates, methoxysilane electron donor and triisobutyllithium ([0026], [0065]-[0077]).

12. Though **Tokui** does not disclose an isotactic pentad index of the butene-1/alpha-olefin copolymer being higher than 98%, nevertheless, it is the examiner's position that the values are close enough that one of ordinary skill in the art would have expected the same properties. Case law holds that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one

skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

13. Though **Tokui** does not specify the product reactivity ratio or absence of 4,1-insertions in the butene-1/alpha-olefin copolymer, nevertheless, since the copolymer of **Tokui** comprises the same composition, produced by the same process, including the use of the same catalyst system as claimed in the instant invention, wherein the copolymer of **Tokui** comprises isotactic pentad content of 98%, polydispersity index of less than 6, therefore, it would have been obvious to a one of ordinary skill in the art that the product reactivity ratio and absence of 4,1-insertions would intrinsically be present in the copolymer of **Tokui** as well.

14. As to instant claim 23, **Tokui** discloses pipes and pipe joints produced from the polybutene-1 resin ([0006]).

15. As to instant claims 14-16, **Tokui** discloses a composition comprising:

1) 90-99.95%wt of the butene-1/alpha-olefin copolymer;

2) 0.05-10%wt of a polypropylene resin ([0009]-[0010]).

16. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mulas et al** (US 6,465,574) in view of **Tokui** (EP 1,215,239).

17. Mulas et al discloses a polymer composition comprising:

1) 5-100 pbw of a **crystalline isotactic copolymer of butene-1** containing 2-10%wt of an ethylene or propylene copolymer (col. 2, lines 23-35);

2) 0-95 pbw of an **elastomeric polyolefin composition** comprising a copolymer of ethylene with a comonomer of the formula CH2=CHR, where R is C2, containing ethylene in quantities of less than 40% (col. 3, lines 1-10). The comonomer comprises 1-butene (col. 3, lines 59-60).

The composition comprises good degree of softness and good mechanical properties (col. 1, lines 38-42).

18. Mulas et al fails to teach the crystalline and elastomeric butene-1 copolymers having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

19. Tokui discloses a composition comprising a mixture of two copolymers of butene-1 and C2-C10 alpha-olefin, each having isotactic pentad content of 98% and polydispersity index of less than 6 ([0012]-[0014]).

20. It is well known in the art, crystallinity and thus melting point of the copolymers, depend on the amount of ethylene comonomer in the polymer. Larger amount of ethylene comonomer will result in the copolymer being more amorphous and having lower melting point. Thus, by varying the amount of ethylene between 1 and 40% mole,

one skilled in the art can produce the butene-1 copolymer with expected crystallinity and melting point. In addition, random isotactic butene-1 –ethylene copolymers with specific amount of ethylene units will have the same properties, which become inherent characteristics of the product. “Products of identical chemical composition can not have mutually exclusive properties” (See MPEP 2112.01).

21. Since

1) Mulas et al discloses a polymer composition comprising:

a) 5-100 pbw of a **crystalline isotactic copolymer of butene-1** containing 2-10%wt of an ethylene or propylene copolymer (col. 2, lines 23-35);

b) 0-95 pbw of an **elastomeric polyolefin composition** comprising a copolymer of ethylene with a 1-butene containing ethylene in quantities of less than 40% , wherein the composition comprises good degree of softness and good mechanical properties (col. 1, lines 38-42), but fails to fails to teach the crystalline and elastomeric butene-1 copolymers having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Tokui** discloses a composition comprising a mixture of <u>two copolymers</u> of butene-1 and C2-C10 alpha-olefin, each having isotactic pentad content of 98% and polydispersity index of less than 6 ([0012]-[0014]), therefore,

it would have been obvious to a one of ordinary skill in the art at the time of the invention was made to make a mixture of <u>two copolymers</u> of butene-1 and C2-C10 alpha-olefin of **Tokui,** having different amounts of the ethylene comonomer and thus

making them one crystalline and the other amorphous, to produce a composition comprising a blend of crystalline and elastomeric copolymers having a good combination of softness and strength, as in composition of **Mulas et al**.

22. Claims 1-13 and 22, 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Masaki et al**, in EP 640,624.

23. Masaki et al discloses a **process for producing olefin copolymers** (p.2, lines 5-6) which can provide a **polyolefin** having extremely high melting point and a **high stereoregularity** (p.2, lines 5-6; p. 3, lines 33-35), wherein the process is advantageous for stereospecific polymerization of an alpha-olefin having 3 or more carbon atoms (butene -1, cited in p. 7, line 25), such as mixture of these olefins with ethylene (p. 7, lines 25-27) butene-1, where the process comprises copolymerizing the above mentioned olefins in the presence of the catalyst system (as to instant claim 24), where the catalyst comprises:

A) titanium, magnesium, halogen components;

B) an organic aluminum compound; and

C) an external donor organic silicon compound represented by the formula:

(R1O)3 – Si - C (CH3)2 CH (R2)(R3);

where R1, R2, R3 represent hydrocarbon group (page 3, lines 33-55). Component A) comprises titanium compounds on magnesium chloride and phthalates as internal

donors (page 4, lines 15-55). Aluminum compound comprises an alkylaluminum compound (page 6, lines 2-30).

As to instant claim 25, the external donor silicon compound comprises thexyltrimethoxysilane (page 7, lines 1-23).

As to instant claim 26, the polymerization is carried out in a liquid monomer (page 7, lines 45-50) and, as to instant claim 27, in two stages under different reaction conditions (page 7, lines 48-49).

24. **Masaki et al** discloses a process for producing a high **stereoregular** polyolefin of 3 or more carbon atoms, including butene-1 copolymer with ethylene (p. 7, lines 25-27). Though **Masaki et al** does not explicitly specify the relative contents of the butene-1 and ethylene monomers, nevertheless, since the process is most advantageous for polymerization of alpha-olefins having 3 carbon atoms or more, therefore, it would have been obvious to a one skilled in the art at the time of the invention was made that butene-1 monomer would be a major monomer copolymerized with a minor monomer of ethylene.

25. Though **Masaki et al** does not specify the copolymer being random, having r1.r2 reactivity ratios being less than 2, or specific isotacticity value of butene-1 units in the copolymer and polydispersity index, nevertheless, since the copolymer of **Masaki et al** is produced by the same process, including the same catalyst system as claimed in the instant invention, therefore, such properties as product reactivity ratios, content of

butene-1 units in form of isotactic pentads, and absence of 4,1 insertions of butene units, will intrinsically be present in the butene-1 copolymer of **Masaki et al** within the same ranges as claimed in the instant invention. "Products of identical chemical composition can not have mutually exclusive properties" (See MPEP 2112.01).

26. Claims 1-13 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Masaki et al** (EP 640,624) in view of **Koshyama et al** (EP 186,287) or **Fukui et al** (US 4,600,762), or **Kohyama et al** (EP 172,961) (**Kohyama et al '961**).

27. The discussion with respect to **Masaki et al** (EP 640,624) set forth in paragraphs 23-25 above, is incorporated here by reference.

28. Masaki et al fails to specify the product reactivity ratio, a content of isotactic pentads and absence of 4,1-insertions of butene units.

29. Koshyama et al'287 and **Fukui et al** disclose processes for producing **random butene-1** copolymer with alpha olefin comprising polymerizing the monomers in the presence of a the same catalyst system comprising:

1) titanium catalyst component containing magnesium, titanium, halogen and a diester electron donor comprising phthalates;

2) an organoaluminum compound, and

3) an organic silicon compound having the following formula:

RnSi(OR1)4-n, where R are alkyl, cycloalkyl or aryl (See col. 11 lines 34-68 in **Fukui et al**; page 13, lines 10-30 in **Koshyama et al'287**).

30. As it is known in the art, a copolymer having reactivity ratio product of r1.r2 < 2 (0.6-1.5) is considered to be random . Therefore, since both **Fukui et al** and **Koshyama et al '287** specify the copolymer, produced by the process using the identical catalyst system as disclosed by **Masaki et al** and claimed in the instant invention, as being random, therefore, the copolymer of **Masaki et al** would intrinsically be random and its product reactivity range will intrinsically fall within the same ranges as claimed in the instant invention.

31. Kohyama et al '961 discloses copolymers of butene-1 with 1 mole% of other olefins produced using the catalyst comprising titanium catalyst component, trialkyl aluminum compound and alkylalkoxysilane , having isotacticity value of 99% and MW distribution (Polydispersity Index) less than 6 (page 2, lines 40-65). The process employed by **Kohyama et al '961** is identical to the presently claimed process, and is identical to the process of **Masaki et al.** The copolymer of **Kohyama et al '961** results in an isotacticity content of greater than 99%.

32. Though **Masaki et al** fails to specify the content of isotactic pentad of the butene-1 copolymer, however, since

a) Masaki et al specifies the polyolefin copolymers, including copolymers of butene-1, as having extremely high melting point and high stereoregularity;

b) Kohyama et al '961 discloses copolymers of butene-1 with 1 mole% of other olefins, produced by the process identical to the presently claimed process, and to the process of **Masaki et al,** including the use of identical the catalyst system comprising titanium catalyst component, trialkyl aluminum compound and alkylalkoxysilane, as having isotacticity triad value of 99% and MW distribution (Polydispersity Index) of less than 6 (page 2, lines 40-65), therefore,

it would have been obvious to a one of ordinary skill in the art at the time of the invention was made, that the content of isotactic pentad of copolymers of **Masaki et al** would intrinsically fall within the same ranges as claimed in the instant invention.

33. **Claims 14-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hwo** in US 4,960,820 (**Hwo '820**) in view of **Masaki et al** (EP 640,624).

34. Hwo '820 discloses a blend comprising (as to instant claims 14-17):

1) 10% by weight of copolymer of butene-1 with 1-30% of another alpha olefin, wherein butene-1 units having 98% isotactic portions, and

2) 90% of propylene copolymer having 1-30% mol of another alpha olefin comonomer (as to instant claim 19, cited in col. 2, lines 32-65). The comonomer comprises ethylene or butene (as to instant claim 18, cited in col. 3, lines 30-32).

The composition comprises an improved processing properties and good optics (col. 1, lines 33-35).

35. Hwo'820 fails to teach the copolymer of butene-1 with 1-30% of another alpha olefin having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

36. Masaki et al discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by a process comprising copolymerizing butene and other alpha-olefins in the presence of the catalyst system where the catalyst comprises:

A) titanium, magnesium, halogen components;

B) an organic aluminum compound; and

C) an external donor organic silicon compound represented by the formula:

(R1O)3 – Si - C (CH3)2 CH (R2)(R3);

where R1, R2, R3 represent hydrocarbon group (page 3, lines 33-55). Component A) comprises titanium compounds on magnesium chloride and phthalates as internal donors (page 4, lines 15-55). Aluminum compound comprises an alkylaluminum compound (page 6, lines 2-30).

Since the butene-1 copolymer of **Masaki et al** is produced by the same process as claimed in the instant invention, therefore, its properties will intrinsically be identical to the properties as claimed in the instant invention.

37. Since

1) Hwo '820 discloses a blend comprising:

a) 10% by weight of copolymer of butene-1 with 1-30% of another alpha olefin, wherein butene-1 units having 98% isotactic portions, and

b) 90% of propylene copolymer having 1-30% mol of another alpha olefin comonomer comprising ethylene or butene, wherein the composition comprises an improved processing properties and good optics see col. 1, lines 34-35); but fails to specify the copolymer of butene-1 with 1-30% of another alpha olefin having specific properties such as the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Masaki et al** discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by the same process as claimed in the instant invention, therefore, having properties intrinsically identical to the properties as claimed in the instant invention; therefore,

it would have been obvious to a one of ordinary skill in the art to substitute the isotactic copolymer of butene-1 with 1-30% of another alpha olefin of **Hwo '820** for the equivalent isotactic butene-1 copolymer having extremely high melting point and a high stereoregularity of **Masaki et al** for the same purpose of preparing a composition having improved processing properties and good optics (see MPEP 2144.06 (II)).

38. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hwo** in US 4,960,820 (**Hwo '820**) in view of **Tokui** (EP 1,215,239).

39. Hwo '820 discloses a blend comprising (as to instant claims 14-17):

1) 10% by weight of copolymer of butene-1 with 1-30% of another alpha olefin, wherein butene-1 units having 98% isotactic portions, and

2) 90% of propylene copolymer having 1-30% mol of another alpha olefin comonomer (as to instant claim 19, cited in col. 2, lines 32-65). The comonomer comprises ethylene or butene (as to instant claim 18, cited in col. 3, lines 30-32).

The composition comprises an improved processing properties and good optics (col. 1, lines 33-35).

40. Hwo'820 fails to teach the copolymer of butene-1 with 1-30% of another alpha olefin having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

41. Tokui discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in Abstract), wherein the copolymer comprises an isotactic pentad index of 98% ([0042]) and polydispersity of not more than 6 (as to instant claim 4, cited in [0041]).

42. The full discussion with respect to **Tokui** set forth in paragraphs 9-15 above, is incorporated here by reference.

43. Since

1) Hwo '820 discloses a blend comprising:

a) 10% by weight of copolymer of butene-1 with 1-30% of another alpha olefin, wherein butene-1 units having 98% isotactic portions, and

b) 90% of propylene copolymer having 1-30% mol of another alpha olefin comonomer comprising ethylene or butene, wherein the composition comprises an improved processing properties and good optics see col. 1, lines 34-35); but fails to specify the copolymer of butene-1 with 1-30% of another alpha olefin having specific properties such as the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Tokui** discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in Abstract), wherein the copolymer comprises an isotactic pentad index of 98% ([0042]) and polydispersity of not more than 6;

therefore,

it would have been obvious to a one of ordinary skill in the art to substitute the isotactic copolymer of butene-1 with 1-30% of another alpha olefin of **Hwo '820** for the equivalent isotactic butene-1 copolymer of **Tokui** for the same purpose of preparing a composition having improved processing properties and good optics (see MPEP 2144.06 (II)).

44. **Claims 14-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Collina et al** (US 6,180,720) in view of **Masaki et al** (EP 640,624).

45. Collina et al discloses a polyolefin mixture comprising:

1) 3-25% of crystalline isotactic copolymers of butene-1 with 0.5-30% of an olefinic comonomer selected from ethylene and propylene (col. 8, lines 51-55); and

2) 75-97% by weight of polyolefin composition comprising a copolymer of propylene with ethylene and/or an alpha olefin having the formula CH2=CHR, wherein R is C2-C8 alkyl (col. 8, lines 28-50).

The mixture comprises good tensile strength (col. 1, lines 35-36).

46. Collina et al fails to teach the copolymer of butene-1 with 1-30% of another alpha olefin having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

47. Masaki et al discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by a process comprising copolymerizing butene and other alpha-olefins in the presence of the catalyst system where the catalyst comprises:

A) titanium, magnesium, halogen components;

B) an organic aluminum compound; and

C) an external donor organic silicon compound represented by the formula:

(R1O)3 – Si - C (CH3)2 CH (R2)(R3);

where R1, R2, R3 represent hydrocarbon group (page 3, lines 33-55). Component A) comprises titanium compounds on magnesium chloride and phthalates as internal donors (page 4, lines 15-55). Aluminum compound comprises an alkylaluminum compound (page 6, lines 2-30).

Since the butene-1 copolymer of **Masaki et al** is produced by the same process as claimed in the instant invention, therefore, its properties will intrinsically be identical to the properties as claimed in the instant invention.

48. Since

1) **Collina et al** discloses a polyolefin mixture comprising:

a) 3-25% of crystalline isotactic copolymers of butene-1 with 0.5-30% of an olefinic comonomer selected from ethylene and propylene and

b) 75-97% by weight of polyolefin composition comprising a copolymer of propylene with ethylene and/or an alpha olefin having the formula CH2=CHR, wherein R is C2 , wherein he mixture comprises good tensile strength (col. 1, lines 35-36); but fails to teach the copolymer of butene-1 with 1-30% of another alpha olefin having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Masaki et al** discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by the same process as claimed in the instant

invention, and thus, having properties intrinsically identical to the properties as claimed in the instant invention; therefore,

it would have been obvious to a one of ordinary skill in the art to substitute the isotactic copolymer of butene-1 with 0.5-30% of another alpha olefin of **Collina et al** for the equivalent isotactic butene-1 copolymer having extremely high melting point and a high stereoregularity of **Masaki et al** for the same purpose of preparing a composition having improved tensile strength (see MPEP 2144.06 (II)).

49. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Collina et al** (US 6,180,720) in view of **Tokui** (EP 1,215,239).

50. Collina et al discloses a polyolefin mixture comprising:

1) 3-25% of crystalline isotactic copolymers of butene-1 with 0.5-30% of an olefinic comonomer selected from ethylene and propylene (col. 8, lines 51-55); and

2) 75-97% by weight of polyolefin composition comprising a copolymer of propylene with ethylene and/or an alpha olefin having the formula CH2=CHR, wherein R is C2-C8 alkyl (col. 8, lines 28-50).

The mixture comprises good tensile strength (col. 1, lines 35-36).

51. Collina et al fails to teach the copolymer of butene-1 with 1-30% of another alpha olefin having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

52. **Tokui** discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in Abstract), wherein the copolymer comprises an isotactic pentad index of 98 ([0042]) and polydispersity of not more than 6 (as to instant claim 4, cited in [0041]).

53. The discussion with respect to **Tokui** set forth in paragraphs 9-15 above, is incorporated here by reference.

54. Since

1) **Collina et al** discloses a polyolefin mixture comprising:

a) 3-25% of crystalline isotactic copolymers of butene-1 with 0.5-30% of an olefinic comonomer selected from ethylene and propylene and

b) 75-97% by weight of polyolefin composition comprising a copolymer of propylene with ethylene and/or an alpha olefin having the formula CH2=CHR, wherein R is C2 , wherein he mixture comprises good tensile strength (col. 1, lines 35-36); but fails to teach the copolymer of butene-1 with 1-30% of another alpha olefin having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Tokui** discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in

Abstract), wherein the copolymer comprises an isotactic pentad index of 98% ([0042]) and polydispersity of not more than 6 (as to instant claim 4, cited in [0041]),

therefore,

it would have been obvious to a one of ordinary skill in the art to substitute the isotactic copolymer of butene-1 with 0.5-30% of another alpha olefin of **Collina et al** for the equivalent isotactic butene-1 copolymer of **Tokui** for the same purpose of preparing a composition having improved tensile strength (see MPEP 2144.06 (II)).

55. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hwo** (4,882,229) (**Hwo '229**) in view of **Masaki et al** (EP 640,624).

56. Hwo '229 discloses a blend of:

1) 8-49% by weight of butene-1 copolymer having isotactic portions of at least 98%; and

2) 51-92% of polyethylene (Abstract, col. 3, lines 15-50).

The blend comprises an improved peel characteristics (Abstract).

57. Hwo '229 fails to teach the butene-1 copolymer of butene-1 having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

58. Masaki et al discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by a process comprising copolymerizing butene and other alpha-olefins in the presence of the catalyst system where the catalyst comprises:

A) titanium, magnesium, halogen components;

B) an organic aluminum compound; and

C) an external donor organic silicon compound represented by the formula:

(R1O)3 – Si - C (CH3)2 CH (R2)(R3);

where R1, R2, R3 represent hydrocarbon group (page 3, lines 33-55). Component A) comprises titanium compounds on magnesium chloride and phthalates as internal donors (page 4, lines 15-55). Aluminum compound comprises an alkylaluminum compound (page 6, lines 2-30).

Since the butene-1 copolymer of **Masaki et al** is produced by the same process as claimed in the instant invention, therefore, its properties will intrinsically be identical to the properties as claimed in the instant invention.

59. Since

1) **Hwo '229** discloses a blend of:

a) 8-49% by weight of butene-1 copolymer having isotactic portions of at least 98%; and

b) 51-92% of polyethylene , wherein the blend comprises an improved peel characteristics (Abstract), but fails to teach the butene-1 copolymer of butene-1 having

the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Masaki et al** discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by the same process as claimed in the instant invention, and thus, having properties intrinsically identical to the properties as claimed in the instant invention; therefore,

it would have been obvious to a one of ordinary skill in the art to substitute the isotactic copolymer of butene-1 of **Hwo '229** for the equivalent isotactic butene-1 copolymer having extremely high melting point and a high stereoregularity of **Masaki et al** for the same purpose of preparing a composition having improved peel characteristics (see MPEP 2144.06 (II)).

60. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hwo** (4,882,229) (**Hwo '229**) in view of **Tokui** (EP 1,215,239).

61. Hwo '229 discloses a blend of:

1) 8-49% by weight of butene-1 copolymer having isotactic portions of at least 98%; and

2) 51-92% of polyethylene (Abstract, col. 3, lines 15-50).

The blend comprises an improved peel characteristics (Abstract).

62. **Hwo '229** fails to teach the butene-1 copolymer of butene-1 having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

63. **Tokui** discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in Abstract), wherein the copolymer comprises an isotactic pentad index of 98% ([0042]) and polydispersity of not more than 6 (as to instant claim 4, cited in [0041]).

64. The discussion with respect to **Tokui** set forth in paragraphs 9-15 above, is incorporated here by reference.

65. Since

1) **Hwo '229** discloses a blend of:

a) 8-49% by weight of butene-1 copolymer having isotactic portions of at least 98%; and

b) 51-92% of polyethylene , wherein the blend comprises an improved peel characteristics (Abstract), but fails to teach the butene-1 copolymer of butene-1 having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Tokui** discloses a polybutene-1 resin comprising a copolymer of 80-100%mol of butene-1 and 0-20%mol of an C2-C10 alpha-olefin (as to instant claims 1, 5-12, cited in

Abstract), wherein the copolymer comprises an isotactic pentad index of 98 ([0042]) and polydispersity of not more than 6;

therefore,

it would have been obvious to a one of ordinary skill in the art to substitute the isotactic copolymer of butene-1 of **Hwo '229** for the equivalent isotactic butene-1 copolymer of **Tokui** for the same purpose of preparing a composition having improved peel characteristics (see MPEP 2144.06 (II)).

66. **Claims 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mulas et al** (US 6,465,574) in view of **Masaki et al** in EP 640,624.

67. Mulas et al discloses a polymer composition comprising:

1) 5-100 pbw of a **crystalline isotactic copolymer of butene-1** containing 2-10%wt of an ethylene or propylene copolymer (col. 2, lines 23-35);

2) 0-95 pbw of an **elastomeric polyolefin composition** comprising a copolymer of ethylene with a comonomer of the formula CH2=CHR, where R is C2, containing ethylene in quantities of less than 40% (col. 3, lines 1-10). The comonomer comprises 1-butene (col. 3, lines 59-60).

The composition comprises good degree of softness and good mechanical properties (col. 1, lines 38-42).

68. Mulas et al fails to teach the crystalline and elastomeric butene-1 copolymers having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units.

69. Masaki et al discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by a process comprising copolymerizing butene and other alpha-olefins in the presence of the catalyst system where the catalyst comprises:

A) titanium, magnesium, halogen components;

B) an organic aluminum compound; and

C) an external donor organic silicon compound represented by the formula:

(R1O)3 – Si - C (CH3)2 CH (R2)(R3);

where R1, R2, R3 represent hydrocarbon group (page 3, lines 33-55). Component A) comprises titanium compounds on magnesium chloride and phthalates as internal donors (page 4, lines 15-55). Aluminum compound comprises an alkylaluminum compound (page 6, lines 2-30).

Since the butene-1 copolymer of **Masaki et al** is produced by the same process as claimed in the instant invention, therefore, its properties will intrinsically be identical to the properties as claimed in the instant invention.

70. As it is well known in the art, crystallinity and thus melting point of the (co)polymer, depend on the amount of ethylene comonomer in the polymer. Larger amount of

ethylene comonomer will result in the copolymer being more amorphous and having lower melting point. Thus, by varying the amount of ethylene between 1 and 40% mole, one skilled in the art can produce the butene-1 copolymer with expected crystallinity and melting point. In addition, random isotactic butene-1 –ethylene copolymers with specific amount of ethylene units will have the same properties, which become inherent characteristics of the product. “Products of identical chemical composition can not have mutually exclusive properties” (See MPEP 2112.01).

71. Since

1) Mulas et al discloses a polymer composition comprising:

a) 5-100 pbw of a **crystalline isotactic copolymer of butene-1** containing 2-10%wt of an ethylene or propylene copolymer (col. 2, lines 23-35);

b) 0-95 pbw of an **elastomeric polyolefin composition** comprising a copolymer of ethylene with a 1-butene containing ethylene in quantities of less than 40% , wherein the composition comprises good degree of softness and good mechanical properties (col. 1, lines 38-42), but fails to fails to teach the crystalline and elastomeric butene-1 copolymers having the product reactivity ratio of less than 2, a content of isotactic pentads > 98% and having no 4,1-insertions of butene units;

2) **Masaki et al** discloses a butene-1 copolymer having extremely high melting point and a high stereoregularity produced by the same process as claimed in the instant invention, and thus, having properties intrinsically identical to the properties as claimed in the instant invention;

3) it is well known in the art, crystallinity and thus melting point of the butene-1 copolymer, depend on the amount of ethylene comonomer in the polymer; larger amount of ethylene comonomer will result in the copolymer being more amorphous and having lower melting point;

therefore,

it would have been obvious to a one of ordinary skill in the art to use the mixture of the two butene-1 copolymers of **Masaki et al** having different content of ethylene comonomers and, thus having different crystallinities and different melting points, similar to the composition of **Mulas et al** to produce a composition having good degree of softness and good mechanical properties (see col. 1, lines 38-42 in **Mulas et al**).

Response to Arguments

72. Applicant's arguments, filed on 04/13/09, with respect to rejection of claims 1-27 have been fully considered and are persuasive. The rejection of claims 1-27 under 35 U.S.C. 102 and 103 has been withdrawn.

72. Regarding a rejection under 35 U.S.C 102 over **Masaki et al** (EP 640,624) Applicant traverses the Examiner's contention that **Masaki et al** discloses a process for producing a high stereoregular butene-1 copolymer, but rather relates to a particular catalyst. Examiner disagrees. **Masaki et al** recites "the present invention relates to a process for preparation of a polyolefin which can provide a **polyolefin** having extremely high melting point and **high stereoregularity** and also a catalyst suitable for the

process" (see p. 2, lines 5-7). Thus, **Masaki et al** provides a process for producing a stereoselective polyolefin, and, since, as it is well known in the art, stereregularity of a polyolefin largely depends on a specific catalyst used for the process, therefore, **Masaki et al** discussed a catalyst used in the process as well. Specifically, **Masaki et al** focuses on specific silane electron donor and specifies thexyltrimethoxysilane as extremely useful (see p. 4, lines 8-13; p. 7, lines 10-11) which is the same as claimed in claim 25 of the instant invention.

72. Applicant argues that **Masaki et al** discloses a variety of olefins that could be polymerized by the catalyst system but provides specific examples only for polymerizing of polypropylene. Examiner disagrees. **Masaki et al** specifies the polyolefins as alpha-olefins having C3 or more carbon atoms in combination with ethylene (p. 7, lines 24-26). Specifically, butene-1, propylene and ethylene (p. 7, lines 24-25).

73. Applicant requested a full translation of Fukui et al (JP 06206940). However, since rejection over **Fukui et al** (JP 06206940) is withdrawn, the translation is not being provided.

74. Regarding rejections of claims 14-23 under 35 U.S.C 103, Applicant argues that not enough motivation is provided to combine the references. Examiner disagrees. Specifically, see new set of rejections of claims 14-22 under 35 U.S.C 103 set forth in paragraphs 16-21, 33-71 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irina Krylova whose telephone number is (571)270-7349. The examiner can normally be reached on Monday-Friday 7:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasudevan Jagannathan can be reached on (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Irina Krylova/
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796